Original Article

ANATOLIAN CURRENT MEDICAL

DOI: 10.38053/acmj.1104920

Anatolian Curr Med J 2022; 4(3); 279-283

The effect of driver age and working hours on increased motorcycle accidents with the COVID-19 pandemic: a cross-sectional case study

Murat Kaya, Hayati Kart, Oytun Derya Tunç, Samed Çatal, Ömer Büyüktopçu, Evrim Şirin

Marmara University, Pendik Training and Research Hospital, Department of Orthopedics and Traumatology, Istanbul, Turkey

Cite this article as: Kaya M, Kart H, Tunç OD, Çatal S, Büyüktopçu Ö, Şirin E. The effect of driver age and working hours on increased motorcycle accidents with the COVID-19 pandemic: a cross-sectional case study. Anatolian Curr Med J 2022; 4(3); 279-283.

ABSTRACT

Aim: In the present study, the purpose was to investigate the effects of environmental and personal risk factors on accidents in the motor courier business, which expanded with the pandemic.

Material and Method: A total of 227 patients who applied to the Emergency Department after motorcycle accidents between After Pandemic (AP) March 2020-March 2022 and Before Pandemic (BP) March 2018-March 2020 period were included in the study. Statistical differences were analyzed regarding the number of motorcycle accidents before and after the pandemic, the occupation of the patients, driving experiences, weather conditions, and the timing of the accident.

Results: No statistically significant differences were detected between the mean age, gender distribution, occupational distribution, accident occurrence time, and duration of experience of the patients in motorcycle accidents admitted to the Emergency Department ($p>0.05$). Statistically significant differences were detected between the weekly working hours of the patients BP and AP ($p<0.05$). The rate of couriers under the age of 30 and their working time were found to be significantly higher than the other occupational groups in the AP period ($p<0.01$).

Conclusion: The present study showed that the increase in motorcycle accidents with the pandemic did not differ professionally but could be associated with the extended working hours and being under 30 years old. The study can provide useful information on designing accident-avoidance policies and guidelines for motorcycle couriers.

Keywords: Motorcycle couriers, personal risk factors, accident-avoidance policies

INTRODUCTION

A new type of Coronavirus was detected in Wuhan, China in December 2019 with a clinic of atypical pneumonia (1). Because of the rapid spread of this virus, which was called COVID-19, it was later declared a pandemic by the World Health Organization (WHO) (2).

The connection between the service sector and customers was provided by digital systems and couriers in the process after the declaration of the pandemic. Motorcycles are often preferred by couriers because they are less affected by the busy traffic and are easy to park on narrow streets (3). As an important part of the delivery sector in this business line, which is called Motor courier, there has been a significant increase in the demand and the number of employees after the pandemic (4).

Being a motorcycle courier is a physically demanding profession resulting from riding a motorcycle. There are no clear rules defined in terms of daily driving and break times for motorcycle couriers (5). The incomes of the motor couriers are determined according to their working hours and the number of goods they deliver. Couriers can only save their income by making more deliveries because of intense competition. For this reason, the probability of taking risks increases. However, changing personal and environmental factors and unsafe working conditions also increase the risks of accident rates in this regard (6).

The present study aimed to evaluate the hospital emergency department motorcycle accident applications during the pandemic period by comparing the analysis of the patients in terms of occupation, driving experience, weather conditions, and the timing of the accidents during the Before Pandemic period.

Corresponding Author: Murat Kaya, kayamuratdr@gmail.com

Received: 18.04.2022 **Accepted:** 31.05.2022

This work is licensed under a Creative Commons Attribution 4.0 International License.

MATERIAL AND METHOD

The study was carried out with the permission of the Marmara University Faculty of Health Sciences, Non-Invasive Clinical Ethics Committee (Date: 24.02.2022, Decision No: 24). The study was carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. No informed consent form was obtained for since this is a retrospective study. After the first COVID-19 case was detected in our country on March 11, 2020, patients were admitted to the emergency department of our hospital, which is a tertiary trauma center, as in the Before Pandemic period, regardless of COVID-19.

A total of 153 patients who applied to the emergency department In the After Pandemic (AP) period as a result of motorcycle accidents between March 2020 and March 2022, and 74 patients from the same period, were taken as the control group to make the study in the Pre-Pandemic (BP) March 2018-March 2020 reliable, were included in the study. Those who were injured by a motorcycle when on foot, patients who were injured because of alcohol or drug use, and those with incomplete medical records or who did not want to participate in the study were excluded from the study.

Retrospective observational data were obtained from the digital recording system and patient files by an orthopedic assistant and an orthopedic specialist. The demographic data, occupation, driving experience (month), weather (clear/cloudy-snow/rainy), and timing of the accident (day-night) were also recorded.

Statistical differences were analyzed in terms of the number of motorcycle accidents applied to the Emergency Department before and after the pandemic, the occupation of patients, driving experiences, weather conditions, and the timing of the accidents.

Statistical Analyses

The NCSS (Number Cruncher Statistical System) 2020 Statistical Software (Utah, USA) program was used for statistical analysis. When the study data were evaluated, descriptive statistical methods (mean, standard deviation, median, frequency, ratio) and the Shapiro Wilk test and Box Plot Graphics were used in case of compliance of the variables with the normal distribution.

The Mann-Whitney U test was used for intergroup comparisons in non-normally distributed variables. The Pearson Chi-Square test was used to compare the qualitative data. Significance was evaluated at the $p<0.05$ level.

RESULTS

The present study was conducted with a total of 227 cases 7% (n=16) of whom were female and 93% (n=211) male, at Marmara University Training and Research Hospital between 2018 and 2022. The ages of the patients who participated in the study ranged from 14 to 66 with an average of 28.78±10.67 years. The demographic characteristics of the patients are given in **Table 1**.

Table 1. The evaluation of demographic characteristics of the patients

	Group		p
	BP (n=74)	AP (n=153)	
Age			[a]0.498
Mean±sd	29.86±11.78	28.26±10.09	
Median (min-max)	26 (14-64)	25 (16-66)	
Gender			[b]0.220
Female (n=16)	3 (4.1)	13 (8.5)	
Male (n=211)	71 (95.9)	140 (91.5)	
Profession			[b]0.006**
Courier (n=80)	19 (25.7)	61 (25.7)	
For transportation (n=110)	48 (64.9)	62 (40.5)	
Passenger (n=18)	4 (5.4)	14 (9.2)	
Non-courier (n=19)	3 (4.1)	16 (10.5)	

[a]Mann Whitney U Test, [b]Pearson Chi-Square test, **p<0,01

No statistically significant differences were detected between the mean age, gender distribution, and occupation of the patients in motorcycle accidents admitted to the emergency departments in BP and AP period ($p>0.05$).

The evaluation of BP and AP weather conditions, accident times, driver experience times, and weekly working hours are given in **Table 2**. No statistically significant differences were detected between the rates of BP and AP emergency admissions according to the weather conditions ($p>0.05$).

Table 2. The evaluation of BP and AP weather and accident times

	Group		p
	BP	AP	
Weather condition			[b]0.074
Cloudy-Clear (n=157)	57 (77.0)	100 (65.4)	
Rain-Snow (n=70)	17 (23.0)	53 (34.6)	
Accident time			[b]0.485
Daytime (06:00-18:00) (n=143)	49 (66.2)	94 (61.4)	
Night-time (18:00-06:00) (n=84)	25 (33.8)	59 (38.6)	
Experience (months)			[a]0.257
Mean±SD	7.16±13.01	5.80±5.95	
Median (min-max)	3 (0.1-96)	4 (0.2-30)	
Weekly working hours (hrs.)			[a]0.033*
Mean±SD	23.50±22.72	32.96±25.55	
Median (min-max)	13 (2-80)	30 (1-91)	

[a]Mann Whitney U Test, [b]Pearson Chi-Square test, *p<0.05

No statistically significant differences were detected between the time of the accident and the duration of experience of BP and AP patients (p>0.05). Statistically significant differences were detected between the weekly working hours of the patients who applied to the BP and AP emergency department (p<0.05). AP working times were significantly longer (**Figure 1**).

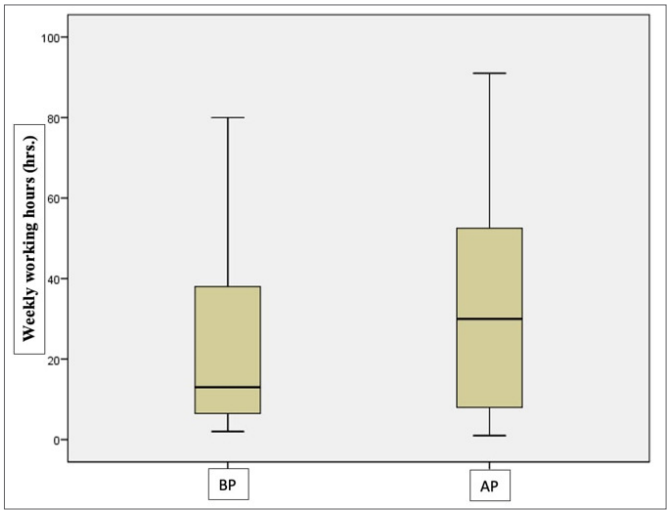

Figure 1. The distribution of BP and AP weekly working hours

The evaluations of the occupations according to age distribution in the BP and AP period are given in **Table 3**. Although no statistically significant differences were detected between age distributions according to occupations in the period of BP (p>0.05); In the AP period, the rate of couriers who were under the age of 30 was found to be significantly higher than other occupational groups (p<0.01).

Table 3. The evaluation of occupations according to age distribution BP and AP

	Age group			P
	<30	30-50	>50	
BP				0.879
Courier	13 (68.4)	4 (21.1)	2 (10.5)	
For transportation	30 (62.5)	13 (27.1)	5 (10.4)	
Passenger	2 (50.0)	2 (50.0)	0 (0)	
Non-courier	3 (100)	0 (0)	0 (0)	
AP				0.008**
Courier	50 (82.0)	9 (14.8)	2 (3.3)	
For transportation	32 (51.6)	26 (41.9)	4 (6.5)	
Passenger	9 (64.3)	3 (21.4)	2 (14.3)	
Non-courier	11 (68.8)	5 (31.3)	0 (0)	

Fisher Freeman Halton test, **p<0,01

DISCUSSION

The first case of COVID-19 was seen in Turkey in the second week of March 2020. After the rapid increase in cases, all countries took measures to protect their citizens and prevent the spread of the disease (7,8). After restaurants closed as part of pandemic measures, our government only allowed motor courier deliveries from restaurants. Also, most supermarkets started motor courier deliveries to reduce social contact and protect against contamination. In the present study, we hypothesized that the increased number of motor courier deliveries manifested itself as a significant increase in the rate of motor courier in motorcycle accidents during the pandemic period. The results of the study were that the motorcycle accident rates in the emergency service admissions increased significant levels by 32.6% in the BP period and 67.4% in the AP period, but the rates of Motor courier in motorcycle accidents did not differ significant levels between the BP and AP periods.

There are many environmental factors affecting traffic accidents of motor couriers (9). The study of Shin et al. (10) on environmental and personal factors in courier accidents showed that 77.2% of courier accidents occurred on cloudy or clear days and 22.8% on rainy or snowy days. A total of 73.5% of the injured couriers had accidents during the day (6:00-18:00) and 26.5% at night (18:00-18:00). In their study, Byun et al. (11) found that the risk of accidents increased in night shifts associated with those working in the courier sector in Korea. In the study of Egozi et al. (4), however, they could not detect significant relations between working conditions and traffic accidents. The difference between the two studies was based on the fact that the couriers in the Korean study were younger, many of them did not have a license, and they mainly worked evening and night shifts. In our study, 69% of motorcycle accidents were on cloudy and clear days, and 31% on rainy and snowy days. Also, 62% of the accidents occurred in the daytime (6:00-18:00) and 38% at night (18:00-18:00). Previous studies are reporting that stress and fatigue factors, which we did not consider in our study, increased the risk of failing to determine the risk in terms of accident and being involved in an accident due to bad decisions (12,13).

Because the barriers to having a job are not difficult for motorcycle couriers, the rate of inexperienced employment without appropriate education and training is high. Shin et al. (10) conducted a study based on the Korean national data bank data in 2019 and showed that 47.2% of the injured couriers had <6 months of work experience and the rate of violations was high (13.9%) among the couriers with <6 months of work experience. Again, Shin et al. (5) In the study, 24.1% of 671 couriers were under the age of 30, 26.5% in their 30s, 24.3% in their 40s, and 25% in their 50s and above. In other words, 75% of them were drivers under the age of 50. In the present study, it was found that although the average work experience was 6 months in the Before Pandemic group, this was around 4 months in the After Pandemic

group. It was also found that 78% of the couriers were drivers under the age of 30, 18.5% were drivers between the ages of 30-50 and 5.7% were drivers over the age of 50. These findings show the need for systematic safety training for inexperienced motorcycle couriers.

A decrease was detected in the total and daily application numbers of trauma patients secondary to the measures taken during the pandemic period (14). Goksoy et al. (15) conducted a study with surgical emergency patients and reported a 25% decrease in admissions. Ilhan et al. (7) showed a 60% reduction in adult trauma patients in their study. Also, Pintado et al. (16) found an 80% decrease in orthopedic trauma applications in their study conducted at a first-level trauma center. Aside from the decrease in general trauma patients in the pandemic period, motorcycle accidents decreased by 39%, as reported in the study of Chiba et al. (17). In the present study, it was found that motorcycle accidents were admitted to the emergency department with a significant increase of 32.6% in the BP period and 67.4% in the AP period. The differences in the studies might have resulted from the trauma patients included in the study from different groups.

The study had some limitations. It had a single-center and retrospective design. Because of the retrospective design, some data were not available. Also, the period selected for the control group was insufficient in terms of comparative data because there were no restrictions on the pandemic. Despite these limitations, the findings show meaningful relations that reinforce the need to explore this industry more deeply to identify areas of professional emphasis and protect safety and health. Further studies are needed to examine the broader scope of risk factors that are associated with the jobs of the couriers beyond the scope of this study.

CONCLUSION

The present study showed that the increase in motorcycle accidents after the pandemic was not occupationally different but could be associated with long working hours and being under 30 years of age, and the working conditions of the couriers were associated with their safety behaviors, safety, and health. The results can provide useful data for designing accident-avoidance policies and guidelines for motorcycle couriers.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of the Marmara University Faculty of Health Sciences, Non-Invasive Clinical Ethics Committee (Date: 24.02.2022, Decision No: 24).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Öztürk Durmaz Ş, Sümer Coşkun A, Yalçın AN. Clinical and prognostic evaluation of patients admitted to the COVID-19 pandemic unit of the emergency department. J Health Sci Med 2021; 4: 835-9.
2. Cucinotta D, Vanelli M. WHO Declares COVID-19 a Pandemic. Acta bio-medica Atenei Parmensis 2020; 91: 157-60.
3. Chung Y, Song TJ, Yoon BJ. Injury severity in delivery-motorcycle to vehicle crashes in the Seoul metropolitan area. Accident Analysis & Prevention 2014; 62: 79-86.
4. Egozi L, Reiss-Hevlin N, Dallasheh R, Pardo A. Couriers' safety and health risks before and during the COVID-19 pandemic. Int Arch Occup Environ Health 2022; 95: 589-98.
5. Shin DS, Park MH, Jeong BY. Human factors and severity of injury of delivery truck crashes registered for work-related injuries in South Korea. Industrial Engineering and Management Systems 2018; 17: 302-10.
6. Byun JH, Yong BY, Park MH. Characteristics of Motorcycle Crashes of Food Delivery Workers. J Ergonomics Soc Korea 2017; 36: 157-68.
7. İlhan B, Bozdereli Berikol G, Aydın H, Arslan Erduhan M, Doğan H. COVID-19 outbreak impact on emergency trauma visits and trauma surgery in a level 3 trauma center. Ir J Med Sci 2021; 7: 1–6.
8. Güngörer B. Baseline demographic, clinical and laboratory risk factors for predicting admission to intensive care unit in patients diagnosed with COVID-19 in the emergency department. Anatolian Curr Med J 2021; 3: 279-283.
9. Clarke DD, Ward P, Bartle C, Truman W. The role of motorcyclist and other driver behaviour in two types of serious accident in the UK. Accident Analysis Prevention 2007; 39: 974-81.
10. Shin DS, Byun JH, Jeong BY. Crashes and traffic signal violations caused by commercial motorcycle couriers. Safety and Health at Work 2019; 10: 213–8.
11. Byun JH, Park MH, Jeong BY. Effects of age and violations on occupational accidents among motorcyclists performing food delivery. Work (Reading, Mass.) 2020; 65: 53–61.
12. Day AJ, Brasher K, Bridger RS. Accident proneness revisited: the role of psychological stress and cognitive failure. Accident Analysis Prevention 2012; 49: 532-5.
13. Smith TD, Hughes K, Dejoy DM, Dyal MA. Assessment of relationships between work stress, work-family conflict, burnout and firefighter safety behavior outcomes. Safety Sci 2018; 103: 287-92.
14. İlhan B, Bozdereli Berikol G, Dogan H. Impact of COVID-19 outbreak on emergency visits and emergency consultations: a cross-sectional study. Cureus 2021; 13: e14052.

15. Göksoy B, Akça MT, Inanç ÖF. The impacts of the COVID-19 outbreak on emergency department visits of surgical patients. COVID-19 salgınının cerrahi hastaların acil servis başvuruları üzerine etkisi. Ulus Travma Acil Cerrahi Derg 2020; 26: 685-92.
16. Pintado JF, Gibaja W, Vallejos RA, Rosas W, Guerra Farfan E, Nunez JH. How COVID-19 has affected emergent visits to a Latin-American trauma department: experience at a Peruvian national trauma referral center. Injury 2020; 51: 2834-9.
17. Chiba H, Lewis M, Benjamin ER, et al. Safer at home: the effect of the COVID-19 lockdown on epidemiology, resource utilization, and outcomes at a large urban trauma center. J Trauma Acute Care Surg 2021; 90: 708-13.